

History of the Ore Mill Site, AZ AA:16:376 (ASM), Tucson, Pima County, Arizona

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ABSTRACT

DATE: 6 September 2006

AGENCY: City of Tucson

REPORT TITLE: History of the Ore Mill Site, AZ AA:16:376 (ASM), Tucson, Pima County, Arizona.

CITY OF TUCSON PROJECT NAME: Ore Mill Site Project

CITY OF TUCSON PROJECT NUMBER: NA

FUNDING LEVEL: City

PROJECT DESCRIPTION: Reassessment in advance of park development

PERMIT NUMBER: NA

LOCATION:

County: Pima

Description: Section 3, Township 14 South, Range 13 East on the USGS 7.5-minute topographic quad Cat Mountain, Ariz. (AZ AA:16 [NE]).

NUMBER OF SURVEYED ACRES: NA

NUMBER OF SITES: 1

LIST OF REGISTER-ELIGIBLE PROPERTIES: Ore Mill Site (AZ AA:16:376 [ASM])

LIST OF INELIGIBLE SITES: 0

RECOMMENDATIONS: Archival research on the ore mill ruins northwest of the intersection of Silverbell Road and Speedway Boulevard indicate the facility was built and used by Arthur Jacobs primarily to process tungsten during World War II. The mill foundations may meet eligibility requirements for the National Register. However, the research conducted to date sufficiently documents the ruins and mitigates the affects of any modifications or demolition. The information may be used by the City to produce interpretive signage for visitors to the proposed park. It is recommended that park development proceed as planned with any necessary modifications to the ruins to enhance safety.

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HISTORY OF THE ORE MILL SITE, AZ AA:16:376 (ASM), TUCSON, PIMA COUNTY, ARIZONA

INTRODUCTION

This report contains the results of an archival search of a parcel located west of Silverbell Road and north of Speedway Boulevard in Tucson, Pima County, Arizona. The parcel contains the remains of an ore mill that was used to process tungsten during the Second World War. The site was given the archaeological designation AZ AA:16:376 (ASM) in 1993, when Desert Archaeology conducted a survey of the project area (Elson 1993). The mill and a nearby house foundation were later mapped and more fully documented (Thiel 1993) in anticipation of a La Cholla Boulevard extension project that was never carried out.

The City of Tucson Parks and Recreation Department is now proposing to convert the parcel into a park with walking trails and interpretive signage. The ore mill ruins pose some safety risks. Some degree of modification or demolition will be necessary if the parcel is to become a public park. Therefore, the City has requested additional research on the ore mill to determine whether archaeological mitigation is warranted. Additional information about the property has been located and is presented here.

Archival research on the ore mill ruins indicate the facility was built and used by Arthur Jacobs primarily to process tungsten during World War II. The mill foundations may meet eligibility requirements for the National Register. However, the research conducted to date sufficiently documents the ruins and mitigates the affects of any modifications or demolition. The information may be used by the City to produce interpretive signage for visitors to the proposed park. It is recommended that park development proceed as planned with any necessary modifications to the ruins to enhance safety.

PROJECT AREA LOCATION AND DESCRIPTION

The project area is located west of Silverbell Road and north Speedway Boulevard in Tucson, Pima County, Arizona. The legal description of the area is the SW $\frac{1}{4}$ of Section 3, Township 14 South, Range 13 East on the USGS 7.5-minute topographic quad Cat Mountain, Ariz. (AZ AA:16 [NE]) (Figure 1). Specifically the project area consists of a 30-acre city-owned vacant parcel (Pima County Assessor Parcel Code 115-10-0090). Current plans call for the development of walking trails (paved and unpaved), a parking area, scenic overlooks with interpretive signage, and new benches.

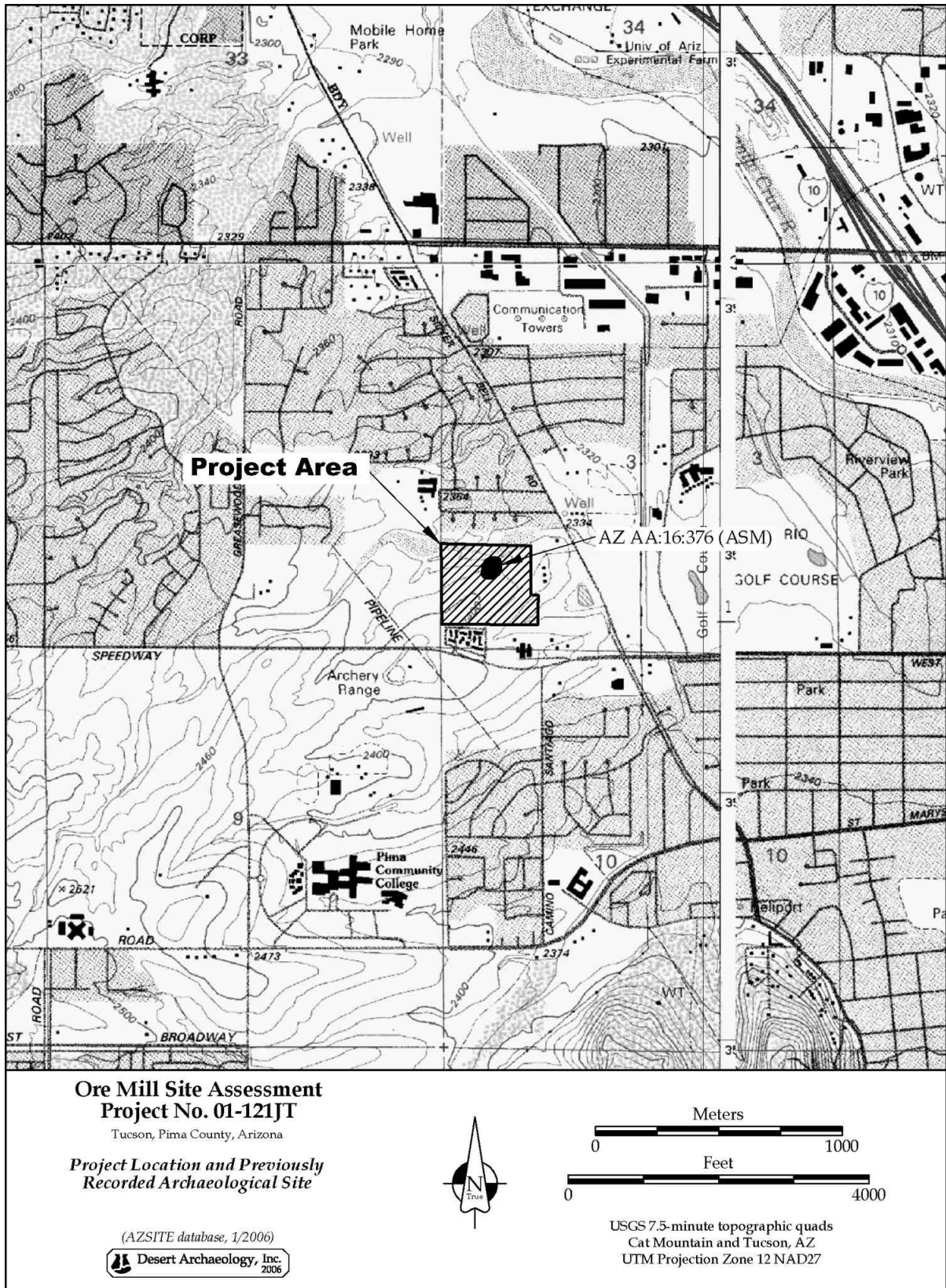


Figure 1. Reproduction of USGS 7.5-minute topographic quad Cat Mountain, Ariz. (AZ AA:16 [NE]), showing location of project area.

PREVIOUS RESEARCH

Archaeological Site Designation

In 1993, the City of Tucson requested an archaeological survey of 21.4 acres on the northeastern corner of Speedway Boulevard and the then proposed extension of La Cholla Boulevard (Elson 1993). The remains of an historical ore mill and a house foundation were recorded as an archaeological site and designated AA:16:376. The parcel was also found to contain an isolated historical artifact (sun-turned purple glass), and four prehistoric artifacts (flaked stone debitage).

AA:16:376 was recorded as the site of a historical mining operation and homestead. Features identified included a complex of cement structures and what was described as a late nineteenth or early twentieth century homestead (house foundation and trash midden). Two cement slabs near the ore mill facility were described, but their function could not be determined. At that time, most of the ore mill lay outside of the surveyed area within Anklam Wash. Little was known about the property, and it was recommended that additional documentation be carried out. The site was also found to potentially meet eligibility requirements for the National Register of Historic Places.

Archival Study and Field Mapping

In October 1993, additional research was undertaken on the ore mill property, and Catherine Gilman and Homer Thiel of Desert Archaeology mapped the mill complex and boulder foundation (Thiel 1993) (Figures 2 and 3). A tape measure ruled in feet was used to determine distances. Some areas were partially obscured by washed-in sediments, and the existence of additional walls or other features could not be ruled out, especially around the fireplace area on the western side of the complex. Elevations were not taken for either feature.

HISTORICAL BACKGROUND

Investigations into the history of the ore mill at Speedway and La Cholla were directed toward understanding its function and how this site fits in with the rest of Arizona's mining history.

A Brief History of Mining in Arizona

Arizona's abundance of mineral resources began to draw prospectors and miners into the territory during the 1850s, spurring population growth and development. Large-scale mining of copper, silver, and gold took place over much of southern and western Arizona. The development of railroads throughout the area, as well as the invention and refinement of mining and extraction processes, resulted in a mining boom. By the 1890s, Arizona was supplying large amounts of metal to the rest of the nation (Canty and Greeley 1987).

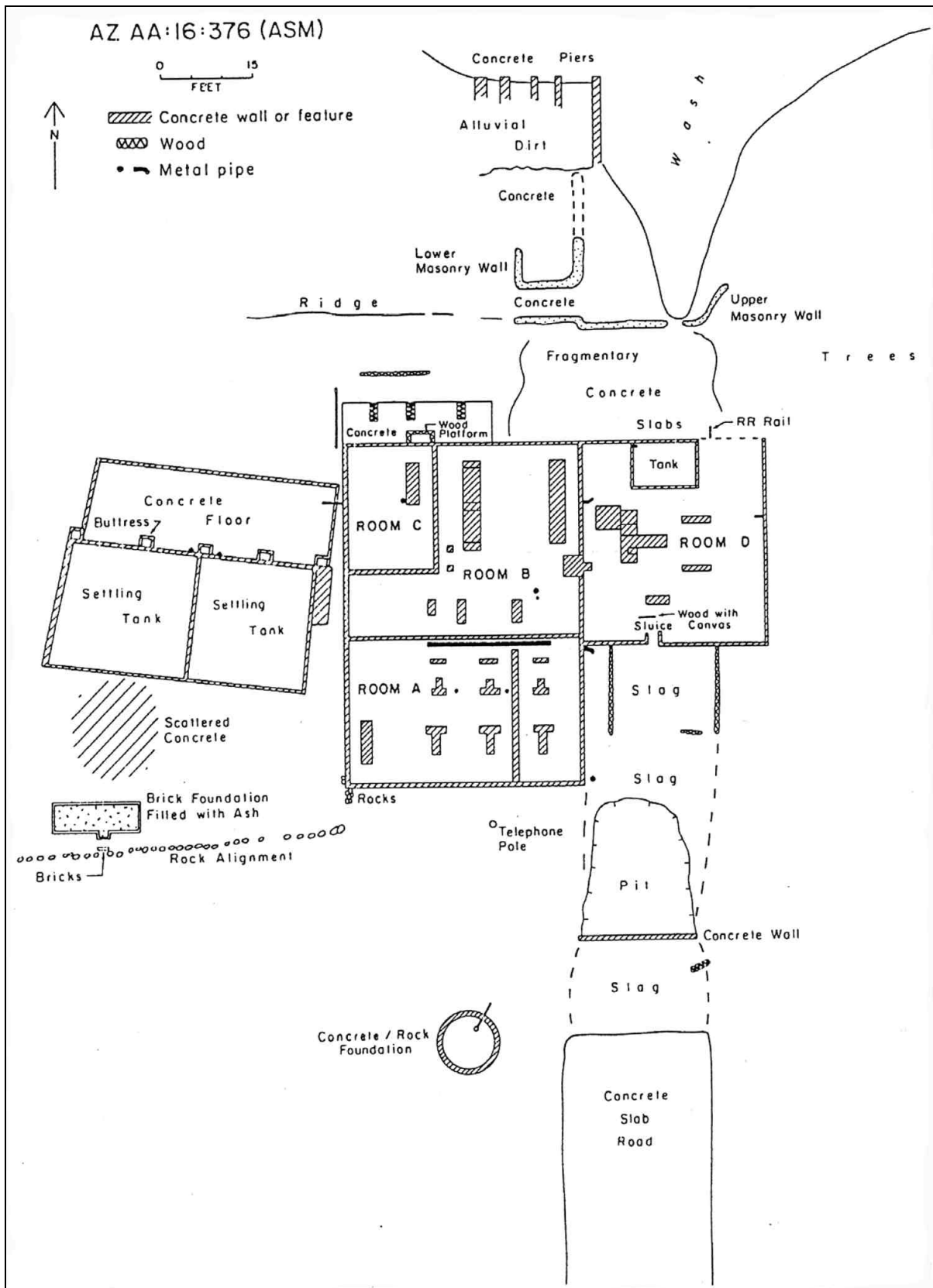


Figure 2. Map of ore mill facility created by Desert Archaeology in 1993.

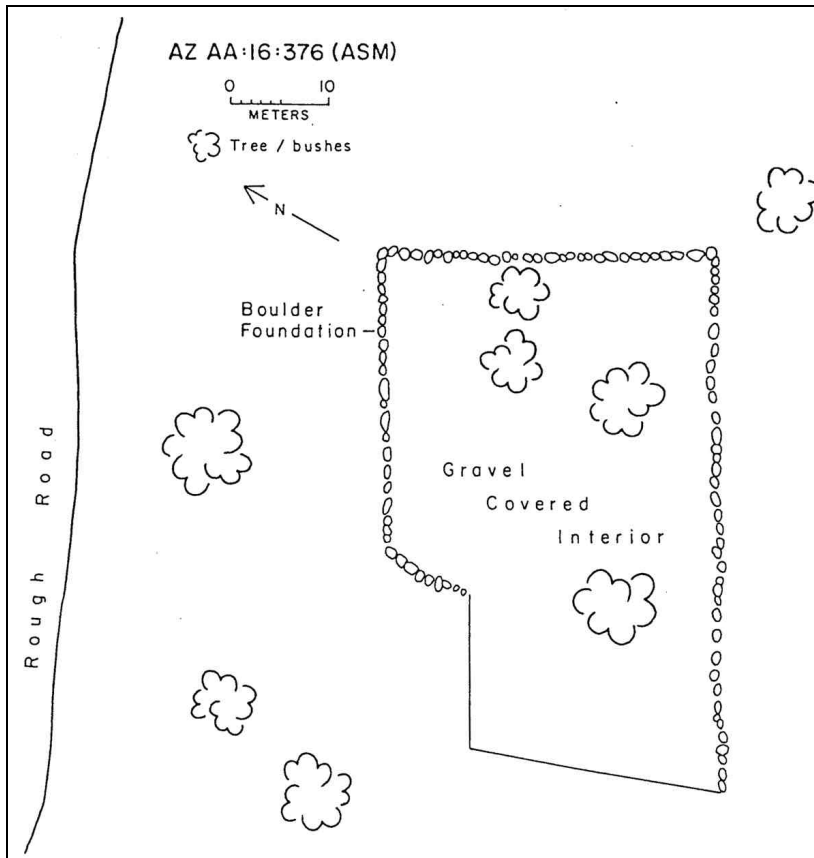


Figure 3. Map of house foundation created by Desert Archaeology in 1993.

Mining requires three basic facilities: mines, concentrating/extraction facilities, and smelters. Mines were located in areas with high metal or mineral content, often following surface indications below ground and searching for hidden deposits. Various types of mining have been used in Arizona. The earliest method was placer mining, where sediments were sifted, screened, or panned in search of precious metals. More ambitious mining programs built underground shafts to follow veins of metal. Large open-pit mines, often called strip mines, were another method used to extract ore.

Once pulled from the earth, ores must be treated to extract metals. Concentrating or milling facilities usually followed a two-stage process, where the ore was first crushed into small pieces, and then the metal removed from the ore. Sometimes this process involved mechanical methods, where the metal was removed due to its heavier weight. Chemical extraction requires a chemical such as mercury or cyanide to remove the metal from the ore. In some cases, smelters were used to heat the ore in order to remove metals.

The concentrated ore was usually melted into standard-sized ingots, especially for the highly valuable silver and gold. In 1912, there were 445 active mines, 72 concentrating facilities or ore mills, and 11 smelters in the new state of Arizona (Keane and Rogge 1992:2). Several ore mills are known to have existed around Tucson, processing copper, wulfenite, lead, and silver (Canty and Greeley 1987:201-202).

History of the Ore Mill Property

Archival research conducted to date consulted records housed at the Public Records Room of the Bureau of Land Management in Phoenix, at the Family History Center in Mesa, at the Arizona Historical Society in Tucson, and at the Pima County Recorder's Office in Tucson. Phone interviews were conducted with Michael Jacobs and Arthur Jacobs Jr., retired. An unsuccessful search for records pertaining to the domestic tungsten processing industry during World War II was also conducted online with several search engines and at the National Archives website.

Prior research indicated that Hugo and Lottie V. Seaberg of Raton, Colfax County, New Mexico, relinquished the property to the City of Tucson in 1906 in exchange for forest land in the Tehachipa Range in California. Further research indicated the Seabergs received this land because they had purchased land rights held by the Santa Fe Railroad Company. In order of ownership, the United States government sold the property to the Santa Fe Railroad Company prior to 1906. In 1906, the Seabergs purchased the property for the sum of \$300 from the railroad. The Seabergs then traded the property to the City of Tucson in exchange for one dollar and the right to select other land. The City of Tucson has held the property since that date.

Archival research began with attempts to collect biographical data on the Seabergs, which were unsuccessful. The census records for New Mexico in 1900 fail to list the Seabergs. No index was made for the 1910 New Mexico census, and so these records were not checked. The Seabergs are not listed in Tucson City Directories for the time period, and biographical data for these individuals were not on file at the Arizona Historical Society. In all likelihood, the Seabergs never lived in the Tucson area.

During World War II, Arthur Jacobs was contracted by the U.S. military to process tungsten at an ore mill within the project area (Figure 4). Although a construction date could not be located, Arthur Jacobs Jr., now a resident of Redondo Beach, California, recalls that the mill was constructed specifically to supply the defense department with tungsten, the most valuable strategic war metal. It was used in tungsten carbide, an extremely hard and heat resistant alloy. It was also used to harden steel and tin and in various electronic components.

Arthur Jr., who was only 4 when World War II began, remembers that the mill was operated under great secrecy, perhaps explaining why it was not listed in city directories at the time. He does not know where the tungsten was mined locally, despite a childhood of joining his father on mine surveys in Southern Arizona. Loads of processed ore were delivered under armed guard in government trucks to the Southern Pacific freight depot and shipped to Kansas City in special unmarked cars. Despite war rationing of gasoline, the mill and Arthur Sr. were allotted an ample supply in order to run the mill.

Arthur Jr. recalls visiting the mill on some occasions when he was a child. He remembers a series of flotation tables in the facility, but little else. He found no photographs of the mill, nor any business records among his father's papers. It is possible that such records were considered classified by the military. It is not clear whether the mill was used much after

World War II, as the Allied victory opened up access to less expensive sources of tungsten in Europe.

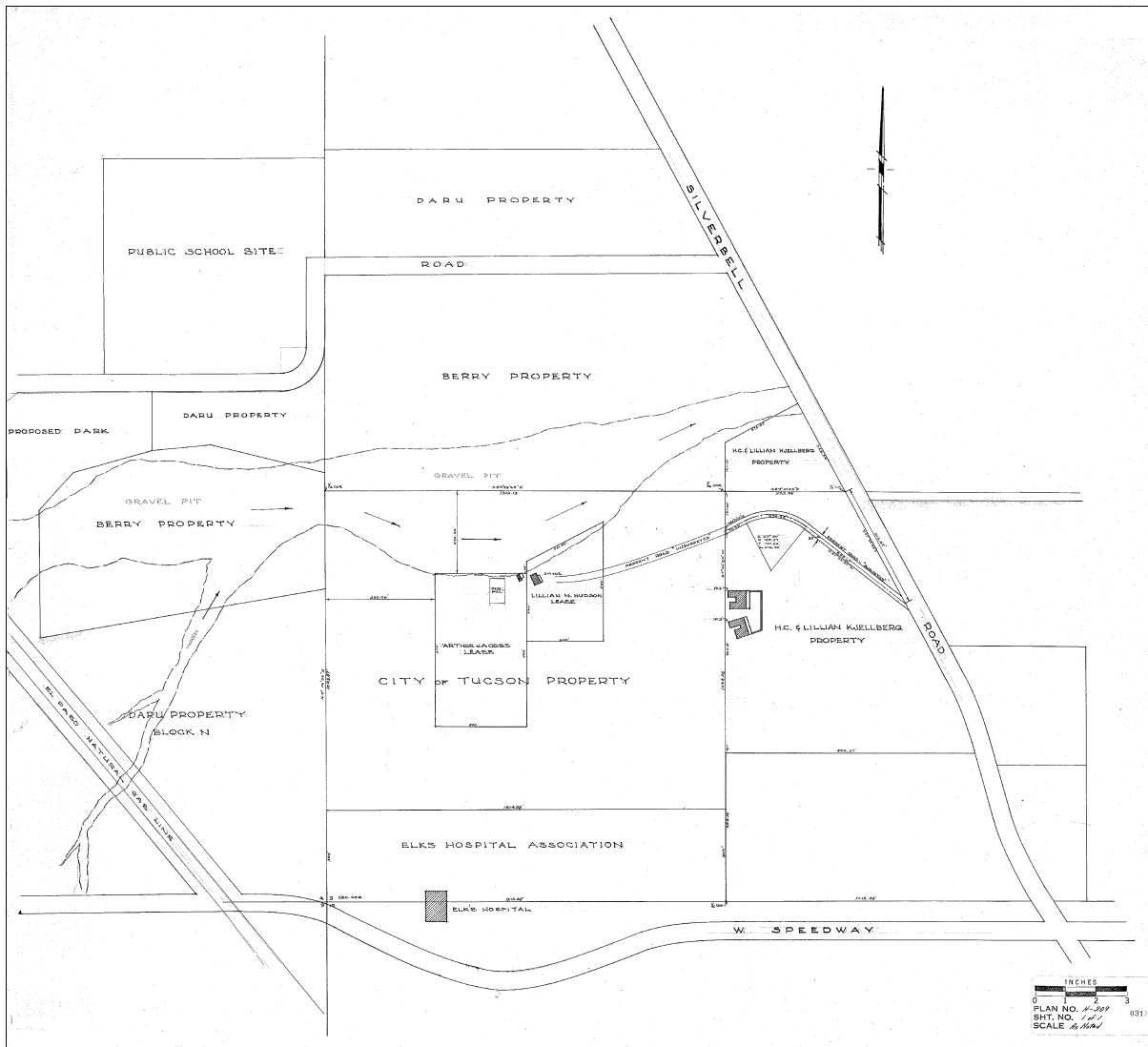


Figure 4. Undated map on file at the City of Tucson Transportation Department, showing the ore mill and adjacent residence some time after 1954.

Operation of the Ore Mill

An ore mill is a facility where ore is crushed and/or chemically treated for metals to be extracted. There is no evidence that heating or smelting of the ore occurred on site. In 1993, George Teague, an archaeologist at the National Park Service's Western Archeological and Conservation Center, was consulted to determine how the ore mill operated. Apparently, ore was brought to the site from either the north or south (probably the former). The equipment mounts in Rooms A and B (see Figure A.2, Appendix) probably held grinding or stamping mills that reduced the ore in size. Ore was probably introduced into Room B

through a large hoist and initial grinding took place. Then the ore was transferred into Room A for further reduction. A large coal-fired electrical generator or steam boiler probably stood in Room D, which is the lowest room in the complex. This piece of equipment stood on huge mounts and was fed coal stored in a large pit south of the building. This pit is now filled with processed rock from which ore was removed.

Once ground in Rooms A and B, which are at a higher elevation than Rooms C and D, the ore was probably mixed with water and carried through large iron pipes into the two settling tanks on the western side of the complex. There, chemicals may have been added to aid in ore extraction. Excess water was drained through pipes into the adjacent wash. The ore was extracted and may have been taken from the site via a now eroded road that passed over the wash. A set of concrete piers located on the northern side of the complex may have bridged the wash. The complex was probably not in operation for a long period of time. If it had been, one would expect large quantities of slag or tailings to be present. These are lacking, except in the pit on the southeastern side of the complex. It is possible that tailings were removed from the site or were carried away in the wash.

The above scenario for ore reduction is hypothetical. It is possible that ore was initially introduced into Room A, traveled to Rooms B and C, and then passed to the settling tanks. The lack of surviving equipment and the general scarcity of published information on ore mill complexes makes interpretation of the remains difficult. Presently, it has been impossible to determine dates of construction and use for the complex. The building is not visible in aerial photographs taken in 1948 and 1971; however, a large amount of vegetation in this area is present and probably obscures the complex.

The ore mill is relatively well preserved, with its poured concrete foundations, equipment mounts, and portions of the iron piping system surviving. Portions of the northern side of the ore mill are presently eroding into the wash. In addition, vandalism has occurred at the facility, with large quantities of graffiti adorning its walls.

History of the Residential Property

East of the ore mill complex is a boulder foundation. This feature is all that remains of a dwelling that once stood on the site. The building is shown on an undated map of the area that post-dates the construction of the Elk's Hospital in 1954. At that time, the property was leased by the City of Tucson to Lillian N. Hudson. Attempts to find information about Ms. Hudson at the Arizona Historical Society were unsuccessful. There is no Lillian Hudson listed in city directories before or after 1954.

Today, the remains of the home are roughly L-shaped and consist of a foundation area filled with dirt and gravel to a height of about 3 ft above the surrounding area (Figures A.16, A.17, and A.18). No artifacts are associated with this feature. An aerial photograph housed in the Map Collection at the University of Arizona Library shows the building had been removed by 1971.

SIGNIFICANCE ASSESSMENT

National Register of Historic Places

The National Register of Historic Places (National Register) is the nation's inventory of historic sites. It was established after the passage of the National Historic Preservation Act of 1966 to promote preservation and study of historic resources. Most projects involving federal agencies, federal land, or federal funds require evaluation and mitigation of their impacts on properties eligible for the National Register. In addition, many state and local laws, ordinances, and regulations require similar evaluations.

In order for a property to be listed in the National Register, it must meet integrity requirements and at least one of four significance criteria. These criteria are summarized in Table 1. An important aspect of significance is a property's historic context (cultural affiliation and dates of use). If a historic context cannot be established, or if the property cannot be shown to be significant within its historic context, then it does not meet eligibility requirements for the National Register. Furthermore, except in special circumstances, properties must be at least 50 years old to be considered for inclusion in the National Register.

Table 1. National Register eligibility criteria (Code of Federal Regulations, Title 36, Part 60).

The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- A. That are associated with events that have made a significant contribution to the broad pattern of our history; or
 - B. That are associated with the lives of persons significant in our past; or
 - C. That embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
 - D. That have yielded, or may be likely to yield, information important in prehistory or history.
-

Significance of the Jacobs Tungsten Mill (AA:16:376 [ASM])

The ore mill located on the subject parcel likely dates to the 1940s or late 1930s. It was operated by Arthur Jacobs at the behest of the U.S. military in order to process tungsten for use in weaponry and metal alloys. It is not clear how long the mill operated or whether the home that was located near the facility was associated with the mine.

The mill is best viewed under the historical context of 'Domestic Strategic Industries of World War II.' Although tungsten was of great strategic importance during World War II, no archival evidence has been located to indicate that the Jacobs mill played a significant role in the industry (Criterion A). Local historical records are scant; it is possible that

formerly classified defense industry records housed at the National Archives, or elsewhere, may contain business records of the mill. However, the Arizona State Historic Preservation Office's (2000) "Generalized Application of Integrity" indicates that in order for a building, site, or structure to meet eligibility requirements for the National Register under Criterion A, it must retain integrity of location, materials, feeling, and association. The latter two aspects are not well preserved at the site, as the function of the ruins is not apparent from the remaining foundations. Furthermore, the missing superstructure detracts heavily from integrity of materials.

The Jacobs mill is associated with the locally prominent Jacobs family, which traces its history in Tucson back to the 1880s when Washington M. Jacobs opened the Jacobs Assay Office. The firm has been family operated ever since. Interviews with surviving family members suggest the mine was not a significant part of the firm's operations (Criterion B). It is possible that Arthur Jacobs would recognize the facility from its current remains; however, the overall integrity of feeling and association, as noted above, is poor.

Buildings, sites, and structures may be listed on the National Register that "embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction" (Criterion C). While the ruins may have once been typical of mid-twentieth century ore mills, or tungsten processing facilities in particular, it is not clear that this particular mill was notable in any way. Furthermore, integrity of design and workmanship has been diminished through the demolition of its superstructure.

To date, archaeological documentation of the mill site has included surface survey, photo documentation, and mapping. It has been possible to determine the general function of most parts of the mill through these efforts. Use dates for the mill have come primarily from historical research. Although the mill ruins are partly buried in some areas, it does not appear to have been substantially larger than what is currently exposed. Furthermore, there is no compelling evidence that the physical remains have the potential to yield additional significant historical information (Criterion D).

Significance of the Hudson House Foundations

The dirt and boulder foundations of a residence are located adjacent to the tungsten mill, and were recorded as a portion of AA:16:376. No evidence has been found to suggest that the house played an important role in history, was associated with prominent historical figures, or that the homesite could yield significant information about history. The foundation itself is unremarkable. The site fails to meet eligibility requirements for the National Register of Historic Places.

SUMMARY AND RECOMMENDATIONS

Archival research on the ore mill ruins northwest of the intersection of Silverbell Road and Speedway Boulevard indicates the facility was built and used by Arthur Jacobs primarily to process tungsten during World War II. The mill foundations may meet eligibility requirements for the National Register. However, the research conducted to date sufficiently documents the ruins and mitigates the affects of any modifications or demolition. The information may be used by the City to produce interpretive signage for visitors to the proposed park. It is recommended that park development proceed as planned with any necessary modifications to the ruins to enhance safety.

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APPENDIX A



Figure A.1. View of Ore Mill Ruins from concrete slab road.



Figure A.2. Rooms A and B with edge of concrete slab road in foreground.



Figure A.3. View of Room A, facing northeast.



Figure A.4. View from Room A, facing northwest and down toward Room B.



Figure A.5. Room D, from Room A, facing northeast.



Figure A.6. Settling tanks, facing west.



Figure A.7. Detail of concrete equipment support and gas pipe in Room B.



Figure A.8. View north toward wash showing lower masonry walls and concrete piers.



Figure A.9. Room D, facing southeast.



Figure A.10. View of Rooms A and B, facing north, with "slag" area in foreground.



Figure A.11. Detail of tank feature within Room D, facing east.



Figure A.12. Looking up from Room B toward concrete slab road.



Figure A.13. View of Room B with settling tanks in rear.



Figure A.14. Concrete slab road, facing east.



Figure A.15. Concrete slab road, facing north.



Figure A.16. House foundation near ore mill, facing south.



Figure A.17. Detail of house foundation showing remnants of boulder alignment.



Figure A.18. House foundation, facing northwest.